



IDETC-CIE 2021

**International Design Engineering
Technical Conferences & Computers
and Information in Engineering
Conference**

DFMLC-1: INTEGRATED PRODUCT AND PROCESS DEVELOPMENT

Session Chair(s): Steven Hoffenson <shoffens@stevens.edu>

Included Topics:

- Integrated design & manufacturing systems
- Virtual and/or collaborative environments in product and process development
- Distributed product and process development
- Domain modeling methodologies standards and tools
- Case studies & industrial applications in integrated product and process development.

DFMLC-2: MODELING AND OPTIMIZATION FOR SUSTAINABLE DESIGN AND MANUFACTURING (JOINT SESSION WITH DAC)

Session Chair(s): Bryony Dupont <dupontb@oregonstate.edu>, William Z. Bernstein
<william.bernstein@nist.gov>

Included Topics:

- Integrating sustainability into conceptual design
- Computer-enabled methods and tools to influence sustainable design
- Design for environmentally conscious manufacturing
- Design for remanufacture and re-use
- Ecological design
- Decision support tools for sustainability,
- Incorporation of social decision factors
- Consumer preference modelling for sustainability
- Novel materials and devices to create sustainable manufacturing processes.

DFMLC-3: LIFE CYCLE DECISION MAKING

Session Chair(s): Fu Zhao <fzhao@ecn.purdue.edu>

Included Topics:

- Product life cycle management
- Decision making in service-oriented life cycles
- Tools and methodologies for life cycle decision making
- Uncertainty modeling, analysis, and management
- Multi-criteria decision analysis and trade-off management
- Change management
- Group-based decision making and stakeholder management.



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DFMLC-4: DESIGN FOR SUPPLY CHAIN AND END OF LIFE RECOVERY

Session Chair(s): Sara Behdad <sara.behdad@essie.ufl.edu>

Included Topics:

- Product supply chain modeling
- Inventory management
- Design for product disassembly and design for take-back management,
- Design for reuse, recycling, remanufacturing
- Design for upgradeability
- Performance analysis of recovery operations and EOL profitability
- Design for Circular economy
- Market positioning and consumer preference modeling of used products

DFMLC-5: DESIGN FOR MANUFACTURING AND ASSEMBLY

Session Chair(s): Soonjo Kwon <soonjo.kwon@kumoh.ac.kr>

Included Topics:

- Design principles for part minimization
- Design for ease of fabrication
- Design for ease of assembly
- Design for ease of packaging
- Modular design
- Tolerance analysis, geometric dimensioning tolerancing (GD&T)
- Optimization of manufacturing and assembly processes.

DFMLC-6: DESIGN FOR ADDITIVE MANUFACTURING

Session Chair(s): Yaoyao Fiona Zhao <Yaoyao.zhao@mcgill.ca>

Included Topics:

- Design for layered manufacturing
- Rapid prototyping
- Environmental impacts of additive manufacturing
- Social impacts of additive manufacturing
- Design principles for additive manufacturing
- Complexity modelling in additive manufacturing
- Intellectual property
- Supply chain design for additive manufacturing



DFMLC-7: DESIGN FOR QUALITY, RELIABILITY, AND COST

Session Chair(s): Peter Sandborn <sandborn@umd.edu>

Included Topics:

- Robust design and uncertainties in the design process
- Product quality control, robust life cycle management, variation management, and cost of ownership.
- Maintainability, warranty prognostics, health monitoring availability
- Obsolescence, qualification/certification, and resilience
- Hardware and software systems engineering for lifecycle cost modeling and costing techniques for specific life-cycle stages
- Predicting in-service/operations and support/utilization and support costs
- Costing for availability and capability
- Knowledge representation and knowledge management in terms of TLC
- Design for cost, and design for service.

DFMLC-8: DESIGN OF PRODUCT-SERVICE SYSTEMS

Session Chair(s): Junfeng Ma <ma@ise.msstate.edu>

Included Topics:

- Product mass customization
- Cost estimation of PSS
- Standards, tools, case studies, and industrial applications in PSS
- PSS for sustainable production & consumption
- Servitization

DFMLC-9: DESIGN OF THERMAL AND ENERGY SYSTEMS

Session Chair(s): Amin Mirkouei <amirkouei@uidaho.edu>

Included Topics:

- Thermal and energy-related manufacturing systems
- Green buildings
- Energy-efficient industrial systems
- Renewable energy systems and electric power systems
- Lifecycle of energy creation, transmission, and storage systems
- Smart grids
- Power & energy in transportation systems (aircrafts, automobiles, ships, trains)
- Green mobility



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DFMLC-10: RECENT ADVANCES IN DESIGN FOR MANUFACTURING AND THE LIFE CYCLE

Session Chair(s): Abigail Clarke-Sather <abbie@d.umn.edu>

Included Topics:

- Design information & informatics
- Industry 4.0 technologies
- Digital twin technologies
- Artificial Intelligence & Machine Learning
- Blockchain technologies
- Internet of Things
- Social, Economic, and Health life cycle assessment (LCA)
- Prospective Life Cycle Assessment (LCA)
- Resilient manufacturing systems
- Virtual/Augmented/Mixed Reality
- Intelligent material recovery networks

DFMLC-11: SPECIAL SESSION: DESIGN FOR MANUFACTURING AND THE LIFE CYCLE IN RESPONSE TO COVID-19

Session Chair(s): Daniel Cooper <drcooper@umich.edu>

Included Topics:

- Design of products, production systems, and supply chains that are resilient to large-scale disruptions caused by events such as the COVID-19 pandemic.
- Methods, tools, and techniques for industrial recovery from large-scale disruptions
- Rethinking product design and industrial production systems in the post COVID-19 era.

DFMLC-12: DESIGN FOR SUSTAINABLE PRODUCT USE AND USER BEHAVIOR (JOINT SESSION WITH DTM)

Session Chair(s): Li Shu <shu@mie.utoronto.ca>, Astrid Layton <alayton@tamu.edu>

Included Topics:

- Product design to support environmentally conscious (or pro-environmental) use behavior, including;
 - Effectiveness of information & feedback
 - Physical product affordances
 - Automation/forcing on achieving desired consumer behavior



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DFMLC-13: SPECIAL SESSION: DESIGN TOOL SHOWCASE

Session Chair(s): Daniel Cooper <drcooper@umich.edu>

Included Topics:

- Novel tools relevant to design research, including
 - Software programs (i.e. spreadsheets, plug-ins, information standards/protocols, databases, etc.)
 - Interactive applications (augmented reality, virtual reality, information visualization, design tools, etc.)
 - Physical prototypes (i.e. method cards, role-playing games, checklists etc.).